

# EXPLANATION OF DATA TABLES FOR ST. GEORGE BASIN ASSESSMENT PROVINCE

## RESULTS

### LOG-N PARAMS (PORE)

Key mathematic parameters that describe log-normal probability distributions for volume of hydrocarbon-bearing rock, in acre-feet, for each play as reported in the **PORE** module of **GRASP**.

**mu**

Natural logarithm of F50 value of log-normal distribution for volume of hydrocarbon-bearing rock, or “ $\mu$ ”, for the subject play. **mu** =  $\ln F50$ . [Note: distribution **mean** =  $e^{(\mu + 0.5[\text{sig. sq.}])}$ .]

**sig. sq.**

The variance of the log-normal distribution for volume of hydrocarbon-bearing rock, or “ $\sigma^2$ ”, for the subject play. **sig. sq.** =  $\{\ln [0.5((F50/F16)+(F84/F50))]\}^2$ .

### N (MPRO)

Number of hydrocarbon pools calculated for the plays by the **MPRO** module of **GRASP** from inputs for probability distributions of prospect numbers and geologic chances of success (approximately the product of play and prospect chances of success). The maximum (**Max**) number of pools for each play was entered into the **MONTE1** module of **GRASP** to fix the number of pools aggregated to calculate play resources.

### Reserves

Sums of recoverable oil and gas volumes for pools within the play, including both proven and inferred reserve categories. A “prop” entry indicates that the reserve data are proprietary.

**BCF**

Billions of cubic feet of gas, recoverable, at standard (surface) conditions (here fixed at a temperature of 60° Fahrenheit or 520° Rankine, and 14.73 psi atmospheric pressure).

**MMB**

Millions of barrels of oil, recoverable, at standard (surface) conditions.

### Undiscovered Potential

Risked, undiscovered, conventionally recoverable oil and gas resources of the play, here reported at **Means** of probability distributions.

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**Mean Pool Sizes of Ranks 1 to 3**      Unrisked (or conditional) mean volumes of recoverable oil and gas in the three largest pools in the play.

### PLAY INPUT DATA

**F100.....F00**      Fractiles for values within probability distributions entered to **GRASP** for calculations of play resources. Four-point distributions (F100, F50, F02, F00) generally indicate that calculations were conducted using log-normal mathematics. Eight-point distributions generally indicate that calculations were conducted using Monte Carlo mathematics. Choice of mathematic approach was in most cases the option of the assessor.

**Prospect Area**      Maximum area of prospect closure, or area within spill contour, in acres. Probability distributions for prospect areas were generally based on distributions assembled independently for each play from large numbers of prospects mapped with seismic reflection data.

**Trap Fill**      Trap fill fraction, or fraction of prospect area in which the reservoir is predicted to be saturated by hydrocarbons.

**Pool Area**      Areal extent of hydrocarbon-saturated part of prospect, in acres. Calculated using **PRASS**, or **SAMPLER** module of **GRASP**, to integrate input probability distributions for prospect areas and trap fill fractions.

**Pay Thickness**      Thickness of hydrocarbon-productive part of reservoir within pool areas, in feet. Probability distributions for prospect areas, trap fill fractions, and pay thicknesses are integrated in the **PORE** module of **GRASP**, to calculate a probability distribution for volume of hydrocarbon-bearing rock, in feet, within the play as reported above under **LOG-N PARAMS (PORE)** .

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<b>Oil Yield (Recov. B/Acre-Feet)</b>	Oil, in barrels at standard (surface) conditions, recoverable from a volume of one acre-foot of oil-saturated reservoir in the subsurface. Oil yield probability distributions were generally calculated in a separate exercise using <b>PRASS</b> to integrate input probability distributions for porosities, oil saturations, oil shrinkage factors (or “Formation Volume Factors”), and oil recovery efficiencies.
<b>Gas Yield (MMCF/Ac.-Ft.)</b>	Gas, in millions of cubic feet at standard (surface) conditions, recoverable from a volume of one acre-foot of gas-saturated reservoir in the subsurface. Distributions were generally calculated in a separate exercise using <b>PRASS</b> to integrate input probability distributions for porosities, gas saturations, reservoir pressures, reservoir temperatures (in degrees Rankine), gas deviation (“Z”) factors, combustible fractions (that exclude noncombustibles such as carbon dioxide, nitrogen, etc.), and gas recovery efficiencies.
<b>Solution Gas-Oil Ratio (CF/B)</b>	Quantity of gas dissolved in oil in the reservoir that separates from the oil when brought to standard (surface) conditions, in cubic feet recovered per barrel of produced oil.
<b>Gas Cond. (B/MMCF)</b>	Quantity of liquids or condensate dissolved in gas in the reservoir that separates from the gas when brought to standard (surface) conditions, in barrels recovered per million cubic feet of produced gas.
<b>Number of Prospects.....</b>	Probability distributions for numbers of prospects in plays, generally ranging from minimum values (F99) representing the numbers of mapped prospects, to maximum values (F00) that include speculative estimates for the numbers of additional prospects that remain unidentified (generally stratigraphic prospects, geophysically indefinite prospects, or prospects expected in areas with no seismic coverage).

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### Probabilities for Oil, Gas, or Mixed Pools

<b>Oil (OPROB)</b>	Fraction of hydrocarbon pools that consist entirely of oil, with no free gas present. Typically, an undersaturated oil pool.
<b>Gas (GPROB)</b>	Fraction of hydrocarbon pools consisting entirely of gas, with no free oil present.
<b>Mixed (MXPROB)</b>	Fraction of hydrocarbon pools that contain both oil and gas as free phases, the gas usually present as a gas cap overlying the oil.
<b>Fraction of Net Pay to Oil (OFRAC)</b>	When a hydrocarbon pool is modeled as a mixed case, with both oil and gas present, the fraction of pool volume that is saturated by oil in the subsurface.
<b>Play Chance Success</b>	Probability that the play contains <u>at least one</u> pool of technically-recoverable hydrocarbons (that would flow into a conventional wellbore in a flow test or during production).
<b>Prospect Chance Success</b>	The fraction of prospects within the play that are predicted to contain hydrocarbon pools, <u>given the condition</u> that at least one pool of technically-recoverable hydrocarbons occurs within the play.

### Play Type (E-F-C)

Play classification scheme.

**E**

**Established** play, in which significant numbers of fields have been discovered, providing the assessor with data for pool size distributions and reservoirs sufficient to allow the assessor to model the play with confidence.

**F**

**Frontier** play, where exploration activities are at an early stage. Some wells have already been drilled to test the play concept but no commercial fields have been established.

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**C**

**Conceptual** play, hypothesized by analysts based on the subsurface geologic knowledge of the area. Such plays remain hypothetical and the play concept has not been tested.

ST. GEORGE BASIN											
				Log-N Params.							
				PORE		N (MPRO)		Reserves		Undiscovered Potential	
Play				Ac/Ft	Ac/Ft	No. Pools		Gas	Oil	Gas	Oil
No.	Area	UAI Code	Name	mu	sig. sq.	Mean	Max	(BCF)	(MMB)	(BCF)	(MMB)
1	St. George	UASG0101	St. George Graben	12.60	0.63	5.48	31	0	0	1007	59
2	St. George	UASG0201	South Platform	13.10	3.08	1.78	16	0	0	898	34
3	St. George	UASG0301	North Platform	13.05	1.79	1.86	15	0	0	676	25
4	St. George	UASG0401	Pribilof Basin	13.67	0.72	1.29	10	0	0	414	17

		MEAN POOL SIZES OF RANKS 1 TO 3											
		Pool #1		Pool #2		Pool #3		INPUT DATA					
PLAY		Gas	Oil	Gas	Oil	Gas	Oil	Prospect Area (Acres)					
No.	Name	(BCF)	(MMB)	(BCF)	(MMB)	(BCF)	(MMB)	F100	F95	F75	F50	F25	F05
1	St. George Graben	523	19.9	302	11.6	219	8.3	976	4113		12497		39916
2	South Platform	2292	86.5	557	21.5	248	9.5	66	1792		24450		333680
3	North Platform	796	30.1	278	10.7	153	5.8	118	2608		18271		127981
4	Pribilof Basin	497	19	252	9.7	174	6.6	2043	11871		35838		108189

		INPUT DATA											
PLAY		Prospect Area (Acres)				Trap Fill (Dec. Frac.)							
No.	Name	F02	F01	F00	F100	F95	F75	F50	F25	F05	F02	F01	F00
1	St. George Graben			163650	0.06	0.12		0.20		0.33			0.71
2	South Platform			9007800	0.02	0.07		0.12		0.23			0.63
3	North Platform			2841696	0.06	0.12		0.20		0.33			0.71
4	Pribilof Basin			628665	0.06	0.12		0.20		0.33			0.71

## ST. GEORGE BASIN

		INPUT DATA													
PLAY		Pool Area (Acres)								Pay Thickness (Feet)					
No.	Name	F100	F95	F75	F50	F25	F05	F02	F01	F00	F100	F95	F75	F50	F25
1	St. George Graben	101	666		2532		9762			43552	48	80		120	
2	South Platform	9	199		3227		53099			1668000	44	85		145	
3	North Platform	13	469		3860		33285			673851	48	80		120	
4	Pribilof Basin	250	1963		7192		27448			262039	48	80		120	

		INPUT DATA															
PLAY		Pay Thickness (Feet)				Oil Yield (Recov. B/Acre-Foot)								Gas Yield (MMCF/Ac.-Ft)			
No.	Name	F05	F02	F01	F00	F100	F95	F75	F50	F25	F05	F01	F00	F100	F95	F75	F50
1	St. George Graben	181			303	28	59		104		185		382	0.032	0.117		0.332
2	South Platform	246			477	38	80		143		256		532	0.038	0.120		0.303
3	North Platform	181			303	39	80		141		251		519	0.037	0.109		0.255
4	Pribilof Basin	181			303	31	65		116		205		424	0.049	0.115		0.229

		INPUT DATA															
PLAY		Gas Yield (MMCF/Ac.-Ft)				Solution Gas Oil Ratio (CF/B)								Gas Cond. (B/MMCF)			
No.	Name	F25	F05	F01	F00	F100	F95	F75	F50	F25	F05	F01	F00	F100	F95	F75	F50
1	St. George Graben		0.940		3.491	89	230		486		1028		2644	20	35		52
2	South Platform		0.763		2.444	64	163		344		725		1856	10	17		25
3	North Platform		0.600		1.760	67	160		321		644		1550	10	17		25
4	Pribilof Basin		0.456		1.084	112	176		253		363		572	20	35		52

ST. GEORGE BASIN													
		INPUT DATA											
PLAY		Gas Cond. (B/MMCF)				Number of Prospects in Play							
No.	Name	F25	F05	F01	F00	F99	F95	F75	F50	F25	F05	F01	F00
	St. George Graben		68		100	16	18		25		52		57
	South Platform		35		50	10	11		17		28		30
	North Platform		35		50	9	10		15		26		27
	Pribilof Basin		68		100	4	5		7		11		12

		INPUT DATA						
		Probabilities for Oil, Gas, or Mixed Pools			Fraction of Net	Play	Prospect	
PLAY		Oil	Gas	Mixed	Pay to Oil	Chance	Chance	Play Type
No.	Name	(OPROB)	(GPROB)	(MXPROB)	(OFRAC)	Success	Success	E - F - C
1	St. George Graben	0.00	0.80	0.20	0.7	0.64	0.30	C
2	South Platform	0.00	0.95	0.05	0.7	0.40	0.20	C
3	North Platform	0.00	0.90	0.10	0.7	0.56	0.20	C
4	Pribilof Basin	0.00	0.80	0.20	0.7	0.56	0.30	C